Application No. 10/677,694
Docket No. IB-8 (A4-1770)
Reply dated February 6, 2008
In response to Office Action of September 6, 2007

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

Claim 1 (Currently amended): A system for monitoring one or more physiological parameters for diagnosis of congestive heart failure within a patient, said system comprising:

at least one sensing device adapted to be implanted in a septum ~~cavity~~ of the patient's heart and monitor said one or more physiological parameters within a heart cavity, ~~cardiovascular system,~~ said sensing device comprising an anchoring mechanism, at least one inductor coil and at least one sensor, with optional electronic components, said anchoring mechanism comprising first and second portions that are separated by the sensor and are both foldable and expandable, the first portion being adapted to pass through an opening of the septum and expand on a distal side thereof within the heart cavity, the second portion being adapted to expand on an oppositely-disposed

proximal side of the septum, the first and second portions being configured to clamp the septum therebetween, said sensor being disposed relative to the anchoring mechanism so that when said sensing device is implanted in the septum from the proximal side thereof and said sensor is within the opening in the septum, the first portion of the anchoring mechanism and a majority of said sensing device are located on the proximal side of the septum, said sensing device has minimum protrusion in the heart cavity on the distal side of the septum to minimize the risk of thrombogenicity, and said sensor is configured to monitor the one or more physiological parameters within the heart cavity; and ~~a portion for passing through a septum of the heart, means adapted for opening on at least one side of the septum, and means adapted for clamping said implantable device to the septum, said at least one sensing device being implantable so that said portion of said anchoring mechanism passes through the septum and, to minimize the risk of thrombogenicity, a larger portion of said implantable sensing device is located in the right side of the heart and a smaller portion of said implantable sensing device is located in the left side of the heart and includes the at least one sensor, said clamping means of the anchoring mechanism comprising said smaller and larger portions of said~~

~~implantable sensing device;~~

a non-implantable readout device that is not adapted to be implanted in the patient, said readout device comprising at least one inductor coil having telemetric means for at least one of electromagnetic telecommunication and electromagnetic wireless powering of said sensor ~~sensing device~~ through said at least one inductor coil of said sensing device.

Claim 2 (Currently amended): A system for monitoring one or more physiological parameters for treatment of congestive heart failure within a patient, said system comprising:

at least one sensing device adapted to be implanted in a cavity of the patient's cardiovascular system, said sensing device comprising at least one inductor coil and at least one sensor, with optional electronic components;

a non-implantable readout device that is not adapted to be implanted in the patient, said readout device comprising at least one inductor coil allowing electromagnetic telecommunication and electromagnetic wireless powering of said sensor ~~sensing device~~ through said at least one inductor coil of said sensing device;

an external unit operable to transmit power to said at least one sensing device; and

wherein said system is part of a closed-loop pacing/ICD (implantable cardioverter defibrillator) tuning mechanism comprising a pacing/ICD unit, said at least one sensing device is interrogated by the pacing/ICD unit, data from said at least one sensing device is sent to the pacing/ICD unit for tailoring of pacing/ICD function, and optionally ~~said system is configured to have a functionality chosen from the group consisting of:~~

~~said at least one sensing device is directly interrogated by the pacing/ICD unit;~~

~~said at least one sensing device is interrogated by the pacing/ICD unit, the system further comprising an external unit solely for transmitting power to said at least one sensing device; and~~

said at least one sensing device transmits data to said readout device, after which said readout device retransmits data to the pacing/ICD unit.

Claim 3 (Previously presented): The system of claim 1 wherein said

at least one sensor of the implantable sensing device comprises at least one capacitive sensor.

Claim 4 (Previously presented): The system of claim 2 wherein said at least one sensor of the implantable sensing device comprises at least one capacitive sensor.

Claim 5 (Original): The system of claim 1 wherein the implantable sensing device includes a battery.

Claim 6 (Original): The system of claim 5 wherein the battery is rechargeable using wireless means.

Claim 7 (Original): The system of claim 2 wherein the implantable sensing device includes a battery.

Claim 8 (Original): The system of claim 7 wherein the battery is rechargeable using wireless means.

Claim 9 (Previously presented): The system of claim 1 wherein the one or more physiological parameters include pressure.

Claim 10 (Previously presented): The system of claim 2 wherein the one or more physiological parameters include pressure.

Claim 11 (Previously presented): The system of claim 9 wherein the at least one sensing device is adapted to be implanted so as to measure at least one of the following pressures: left ventricular end diastolic pressure, left atrium, left atrium appendage, mean left atrium pressure, left side of the heart, right side of the heart, right atrium, mean right atrium pressure, right ventricular end diastolic pressure, differential pressure between left and right atrium.

Claim 12 (Original): The system of claim 11 wherein said system calculates the change of pressure over time (dp/dt).

Claim 13 (Previously presented): The system of claim 10 wherein

the at least one sensing device is adapted to be implanted so as to measure at least one of the following pressures: left ventricular end diastolic pressure, left atrium, left atrium appendage, mean left atrium pressure, left side of the heart, right side of the heart, right atrium, mean right atrium pressure, right ventricular end diastolic pressure, differential pressure between left and right atrium.

Claim 14 (Original): The system of claim 13 wherein said system calculates the change of pressure over time (dp/dt).

Claims 15 and 16 (Canceled)

Claim 17 (Previously presented): The system of claim 1 wherein a resonant scheme is used to couple the sensing device to the readout device.

Claim 18 (Previously presented): The system of claim 2 wherein a resonant scheme is used to couple the sensing device to the readout device.

Claim 19 (Previously presented): The system of claim 1 wherein a passive scheme is used to couple the sensing device to the readout device.

Claim 20 (Previously presented): The system of claim 2 wherein a passive scheme is used to couple the sensing device to the readout device.

Claim 21 (Previously presented): The system of claim 1 wherein an active scheme is used to couple the sensing device to the readout device.

Claim 22 (Previously presented): The system of claim 2 wherein an active scheme is used to couple the sensing device to the readout device.

Claim 23 (Previously presented): The system of claim 1 wherein the one or more physiologic parameters monitored by the system includes one or more of the following parameters: pressure, temperature, flow , blood composition, blood gas content, chemical composition, acceleration, vibration.

Claim 24 (Previously presented): The system of claim 2 wherein the

one or more physiologic parameters monitored by the system includes one or more of the following parameters: pressure, temperature, flow, blood composition, blood gas content, chemical composition, acceleration, vibration.

Claim 25 (Previously presented): The system of claim 1 wherein the at least one sensing device is adapted to be implanted at a location chosen from the group consisting of: atrial septum, ventricular septum, aorta, left ventricle, left atrium, left atrium appendage, right ventricle, right atrium, pulmonary artery, wedge position in pulmonary artery.

Claim 26 (Previously presented): The system of claim 2 wherein the at least one sensing device is adapted to be implanted at a location chosen from the group consisting of: atrial septum, ventricular septum, aorta, left ventricle, left atrium, left atrium appendage, right ventricle, right atrium, pulmonary artery, wedge position in pulmonary artery.

Claim 27 (Previously presented): The system of claim 1 wherein said system is adapted for use in at least one of the following applications:

early diagnosis of a heart failing due to congestive heart failure related conditions, early intervention in treatment of congestive heart failure related conditions, tailoring of medications, disease management, identification of complications from congestive heart failure related conditions, identification of complications from cardiovascular disease related conditions, treatment of complications from congestive heart failure related conditions, treatment of complications from cardiovascular disease related conditions, feedback regarding the impact of medication on the heart, pacing adjustments, reduction in frequency and severity of hospitalizations due to cardiovascular diseases, reduction in frequency and severity of hospitalizations due to congestive heart failure, tuning of defibrillator or pacemaker parameters to improve congestive heart failure related conditions, identification of mitral valve stenosis, treatment of mitral valve stenosis.

Claim 28 (Previously presented): The system of claim 2 wherein said system is adapted for use in at least one of the following applications: early diagnosis of a heart failing due to congestive heart failure related conditions, early intervention in treatment of congestive heart failure related

conditions, tailoring of medications, disease management, identification of complications from congestive heart failure related conditions, identification of complications from cardiovascular disease related conditions, treatment of complications from congestive heart failure related conditions, treatment of complications from cardiovascular disease related conditions, feedback regarding the impact of medication on the heart, pacing adjustments, reduction in frequency and severity of hospitalizations due to cardiovascular diseases, reduction in frequency and severity of hospitalizations due to congestive heart failure, tuning of defibrillator or pacemaker parameters to improve congestive heart failure related conditions, identification of mitral valve stenosis, treatment of mitral valve stenosis.

Claim 29 (Previously presented): The system of claim 1 wherein said readout device is adapted for use in at least one of the following: remote monitoring of congestive heart failure patients, monitoring of congestive heart failure patients with telephone-based (or similar method) data and information delivery, monitoring of congestive heart failure patients with wireless telephone-based (or similar method) data and information delivery, monitoring

of congestive heart failure patients with web-based (or similar method) data and information delivery, closed-loop drug delivery to treat congestive heart failure, closed-loop pacemaker parameter tuning to treat congestive heart failure or congestive heart failure related conditions, warning systems for critical worsening of congestive heart failure or congestive heart failure related conditions, portable or ambulatory monitoring or diagnosis, battery-operation capability, data storage, reporting global positioning coordinates for emergency applications, communication with other medical devices chosen from the group consisting of pacemakers, defibrillator, implantable cardioverter defibrillator, implantable drug delivery systems, non-implantable drug delivery systems, and wireless medical management systems.

Claim 30 (Previously presented): The system of claim 2 wherein said readout device is adapted for use in at least one of the following: remote monitoring of congestive heart failure patients, monitoring of congestive heart failure patients with telephone-based (or similar method) data and information delivery, monitoring of congestive heart failure patients with wireless telephone-based (or similar method) data and information delivery, monitoring

of congestive heart failure patients with web-based (or similar method) data and information delivery, closed-loop drug delivery to treat congestive heart failure, closed-loop pacemaker parameter tuning to treat congestive heart failure or congestive heart failure related conditions, warning systems for critical worsening of congestive heart failure or congestive heart failure related conditions, portable or ambulatory monitoring or diagnosis, battery-operation capability, data storage, reporting global positioning coordinates for emergency applications, communication with other medical devices chosen from the group consisting of pacemakers, defibrillator, implantable cardioverter defibrillator, implantable drug delivery systems, non-implantable drug delivery systems, and wireless medical management systems.

Claim 31 (Previously presented): A system for monitoring one or more physiological parameters for at least one of diagnosis and treatment of congestive heart failure within a patient, said system comprising:

at least one sensing device adapted to be implanted in a cavity of the patient's cardiovascular system, said sensing device comprising at least one inductor coil and at least one sensor, with optional electronic components;

a non-implantable readout device that is not adapted to be implanted

in the patient, said readout device comprising at least one inductor coil having telemetric means for at least one of electromagnetic telecommunication and electromagnetic wireless powering of said sensing device through said at least one inductor coil of said sensing device;

wherein the system is incorporated into a closed-loop system with a left atrium to right atrium unidirectional valve for preventing the development of pulmonary edema.

Claim 32 (Canceled)

Claim 33 (Original): The system of claim 1 wherein said non-implantable readout device includes a barometric pressure sensor.

Claim 34 (Previously presented): The system of claim 33 wherein said barometric pressure sensor is adapted to compensate for variations in atmospheric pressure.

Claim 35 (Original): The system of claim 2 wherein said non-

implantable readout device includes a barometric pressure sensor.

Claim 36 (Previously presented): The system of claim 35 wherein said barometric pressure sensor is adapted to compensate for variations in atmospheric pressure.

Claim 37 (Previously presented): The system of claim 1 wherein said implantable sensing device is configured for implantation using a minimally invasive outpatient technique.

Claim 38 (Previously presented): The system of claim 1 wherein said implantable sensing device is configured for implantation using a catheter delivery method.

Claim 39 (Previously presented): The system of claim 2 wherein said implantable sensing device is configured for implantation using a minimally invasive outpatient technique.

Claim 40 (Previously presented): The system of claim 2 wherein said implantable sensing device is configured for implantation using a catheter delivery method.

Claims 41-43 (Canceled)

Claim 44 (Currently amended): The system of claim 1 wherein said first and second ~~smaller and larger~~ portions of said anchoring mechanism comprise two opposing umbrella-shaped structures. ~~anchors adapted to be disposed on opposite sides of the atrial septum.~~

Claims 45-47 (Canceled)

Claim 48 (Previously presented): The system of claim 1 wherein said anchoring mechanism is made from one or more or any combination thereof of the following materials: nitinol, teflon, stainless steel, polymer, titanium, biocompatible metals.

Claim 49 (Previously presented): The system of claim 2, wherein said implantable sensing device comprises an anchoring mechanism chosen from the group consisting of: anchoring mechanisms for septal occluder devices, anchoring mechanisms for left atrial appendage occluders, anchoring mechanisms for cardiac pacing leads, screws, tines, stents.

Claim 50 (Previously presented): The system of claim 49 wherein said anchoring mechanism comprises a portion adapted for passing through a septum wall of the heart and means adapted for opening on at least one side of the septal wall and clamping said implantable device to the septal wall.

Claim 51 (Previously presented): The system of claim 49 wherein said anchoring mechanism comprises a portion adapted for passing through the atrial septum of the heart.

Claim 52 (Previously presented): The system of claim 51 wherein the anchoring mechanism comprises two umbrella-shaped anchors adapted to be disposed on opposite sides of the atrial septum.

Claim 53 (Previously presented): The system of claim 51 wherein said implantable sensing device comprises a larger portion adapted to be located in the right side of the heart and a smaller portion adapted to be located in the left side of the heart and includes at minimum said at least one sensor in order to minimize the risk of thrombogenicity.

Claim 54 (Original): The system of claim 49 wherein said anchoring mechanism is a helical screw.

Claim 55 (Previously presented): The system of claim 49 wherein said anchoring mechanism is a tine adapted to catch on a trabeculated area of the heart

Claim 56 (Previously presented): The system of claim 49 wherein said anchoring mechanism is made from one or more or any combination thereof of the following materials: nitinol, teflon, stainless steel, polymer, titanium, biocompatible metals.

Claim 57 (Previously presented): The system of claim 1 wherein said implantable sensing device is augmented with at least one actuator chosen from the group consisting of: thermal generators, voltage sources, current sources, probes, electrodes, drug delivery pumps, valves, meters, microtools for localized surgical procedures, radiation emitting sources, defibrillators, muscle stimulators, pacing stimulators.

Claim 58 (Previously presented): The system of claim 2 wherein said implantable sensing device is augmented with at least one actuator chosen from the group consisting of: thermal generators, voltage sources, current sources, probes, electrodes, drug delivery pumps, valves, meters, microtools for localized surgical procedures, radiation emitting sources, defibrillators, muscle stimulators, pacing stimulators.

Claim 59 (Canceled)

Claim 60 (Currently amended): The system of claim 1, wherein said at least one sensing device is directly interrogated by a ~~by the~~ pacing/ICD

unit.

Claim 61 (Currently amended): The system of claim 1, wherein said at least one sensing device is interrogated by a ~~by the~~ pacing/ICD unit and powered by an ~~by the~~ external unit.

Claim 62 (Currently amended): The system of claim 1, wherein said at least one sensing device transmits data to said readout device, which said readout device retransmits data to a ~~to the~~ pacing/ICD unit.

Claim 63 (Previously presented): The system of claim 62 wherein said readout device and said pacing/ICD unit perform at least one function of interrogation or powering of said at least one sensing device.

Claim 64 (Canceled)

Claim 65 (Previously presented): The system of claim 2 wherein said at least one sensing device is directly interrogated by the pacing/ICD unit.

Claim 66 (Canceled)

Claim 67 (Previously presented): The system of claim 2 wherein said at least one sensing device transmits data to said readout device, after which said readout device retransmits data to the pacing/ICD unit.

Claim 68 (Previously presented): The system of claim 67 wherein said readout device and said pacing/ICD unit perform at least one function of interrogation or powering of said at least one sensing device.

Claim 69 (Previously presented): The system of claim 1 wherein at least a portion of said implantable sensing device is coated with one or more layers of at least one coating material.

Claim 70 (Previously presented): The system of claim 69 wherein the at least one coating material is chosen from the group consisting of: silicone, hydrogels, parylene, polymer, nitrides, oxides, nitric-oxide generating materials, carbides, silicides, titanium.

Claim 71 (Previously presented): The system of claim 2 wherein at least a portion of said implantable sensing device is coated with one or more layers of at least one coating material.

Claim 72 (Previously presented): The system of claim 71 wherein the at least one coating material is chosen from the group consisting of: silicone, parylene, hydrogels, polymer, nitrides, oxides, nitric-oxide generating materials, carbides, silicides, titanium.